
1 Minute Madness

About me

- Mark Snaith
- Argumentation Research Group @ University of Dundee (arg:Dundee)
- Broadly – argument revision
- About to enter my third year(!)
- Previously: BSc (Hons) in Applied Computing from same place
- Developed first version of OVA (Online Visualisation of Argument) as final year project - http://ova.computing.dundee.ac.uk

My research

- Justified argument revision in dialogue
- Applying belief revision principles (minimal change) to argumentation systems
- Capturing unique features of argumentation when deciding "minimal change" – acceptability, defeat, semantics
- Combining into a model for argument revision
- Then applying to dialogue – commitments and beliefs

Contact

- http://marksnaith.net
- http://arg.dundee.ac.uk (group website)
- Twitter: @marksnaith
- Email: marksnaith@computing.dundee.ac.uk

Myself

Name: Evgenios
Surname: Hadjisoteriou
Email: csp7he2@cs.ucy.ac.cy
Institute: University of Cyprus, Dept. of Computer Science
Earlier Studies:

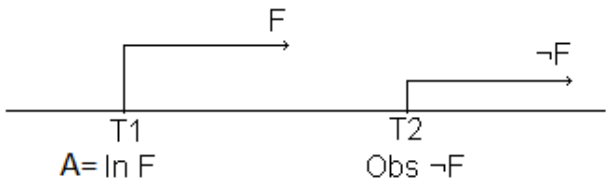
- Undergraduate: Mathematics at National and Kapodistrian University of Athens
- Postgraduate: Logic at The University of Manchester

Now I am working with Dr. Antonis C. Kakas at the University of Cyprus. My research interests are Computational Logic, Abduction, Argumentation and Non monotonic reasoning. Previous work "Argumentation and Temporal Persistence".

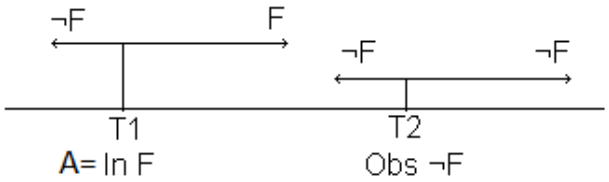
Motivation

- Understand Temporal Persistence via Argumentation
  - Study this in the specific content of Language $\mathcal{E}$

  - Not all domains of Language $\mathcal{E}$ are consistent



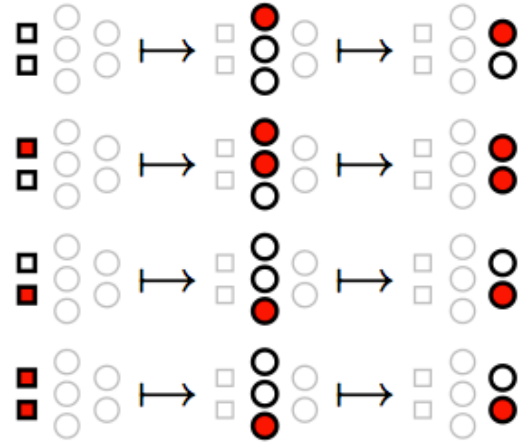
- Extend Language $\mathcal{E}$ by introducing new arguments for backwards persistence and persistence from observations



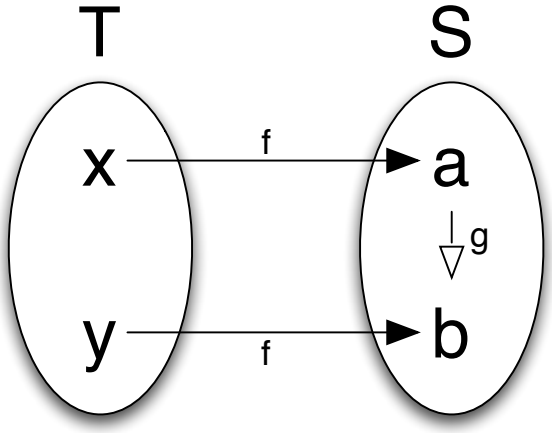
Main Results

Recover and also extend Language $\mathcal{E}$, when same priority is assigned to conflicting forward and backwards persistence arguments

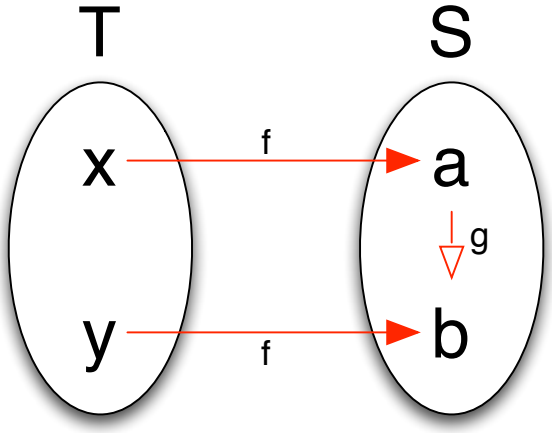
$$\{\} \mapsto \{A\}$$
$$\{A\} \mapsto \{A, B\}$$
$$\{B\} \mapsto \{B\}$$
$$\{A, B\} \mapsto \{B\}$$



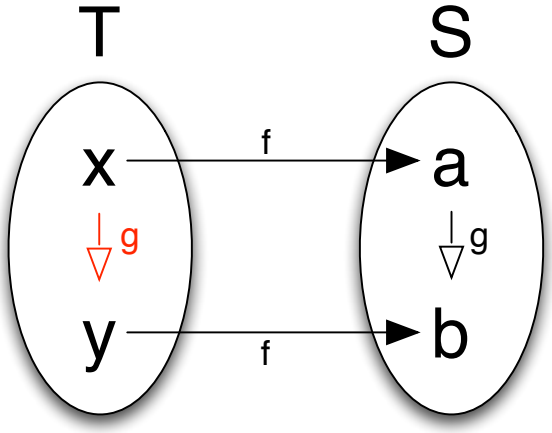
NEURAL-SYMBOLIC APPROACH TO THE THEORY OF METAPHOR



g(x)?

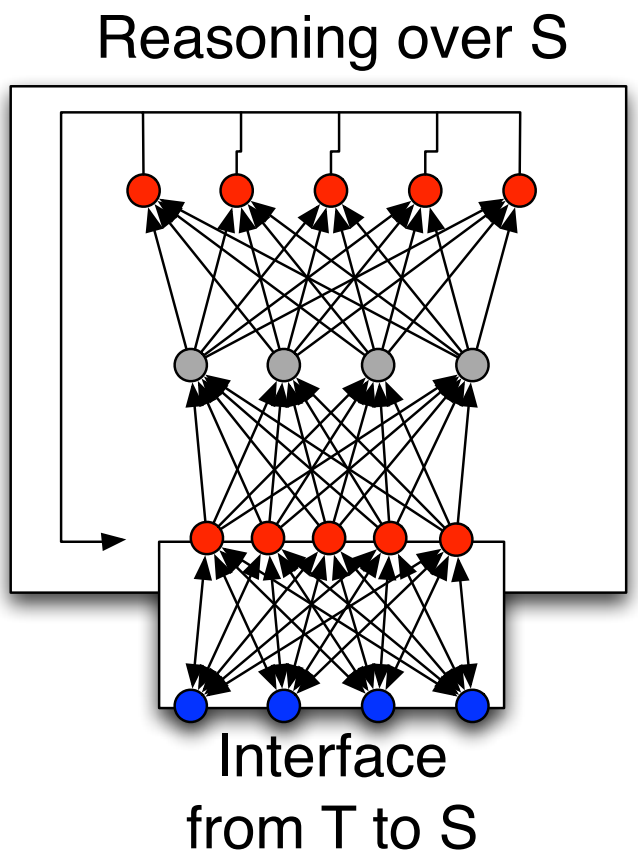


f^-1(g(f(x))=y



g(x)=y

Working hypothesis: metaphor as an interface



- Mapping function properties
- RBM vs multilayer feedforward
- learning vs reasoning
- multiagent 'commitment' perspective
- Encapsulation and sw-reuse

UNIVERSITY OF LIVERPOOL

Luke Riley

A Persuasive Dialogue Game for Coalition Formation

Multi-Agent Systems, Dialogue Games, Argumentation, Coalition Formation, Persuasion

Research Area overview

- In **Multi-Agent Systems** (group of autonomous, rational and interacting A.I.-like programs) protocols need to be developed for the agents to join together (**form a coalition**) to achieve goals (e.g. make money, promote values,….).
- **Argumentation** allows agents to reason on their disputes in a rational manner, logically shown with an argumentation framework, with arguments that are attacked and defended.
- **Dialogue games** (based on the theory of speech acts) allows agents to build argumentation frameworks while interacting.
- **Persuasive dialogue games** aim to convince other agents of some viewpoint currently held.
- How do I link these areas together….?

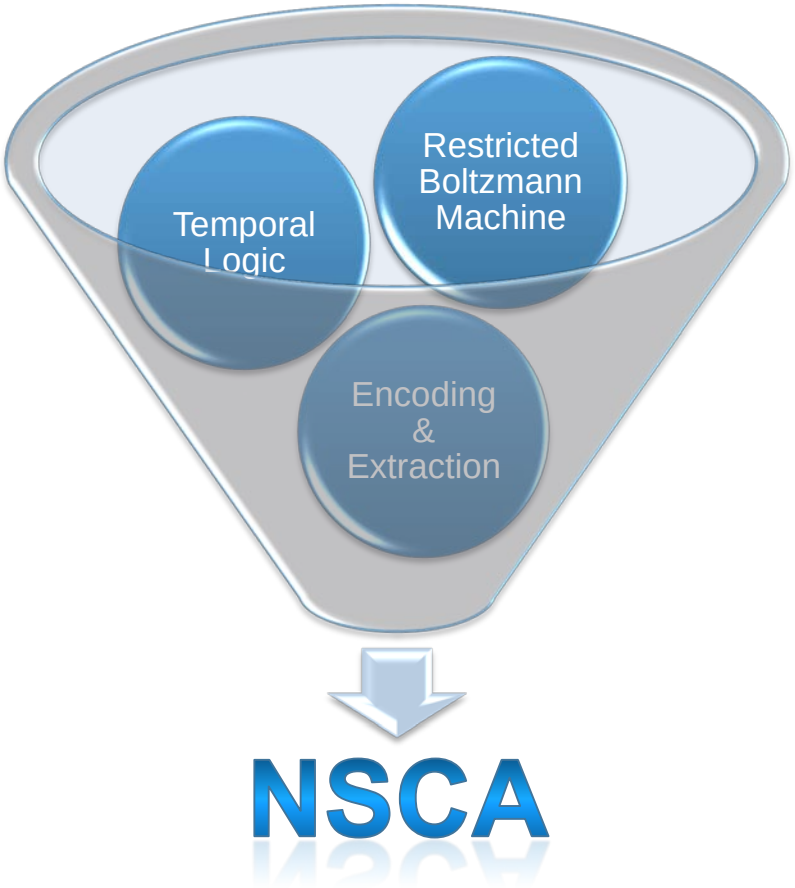
My work

- Allows agents to form teams (**coalitions**) in environments where they share different incomplete views of the world and different opinions on what is the best action to perform (**argumentation**) by communicating their preferences (**dialogue game**) and defending their opinions (**persuasion**) if necessary.
- Inferences from their environment can be clearly shown via a argumentation scheme
- Agents can learn from other agents utterances and change their future moves accordingly.
- Currently for a benevolent system but will be expanded to a dynamic open environment.

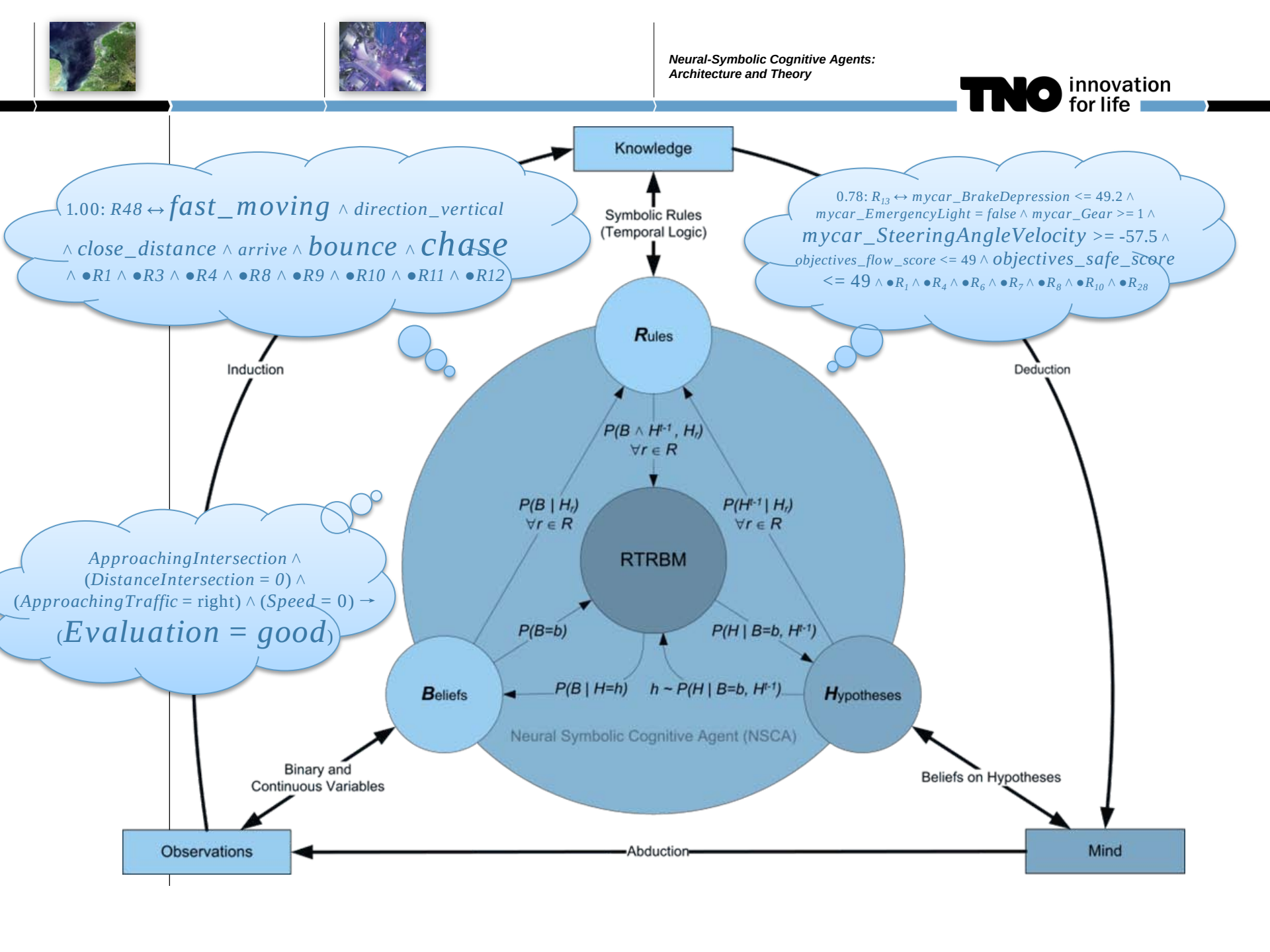

TNO innovation for life

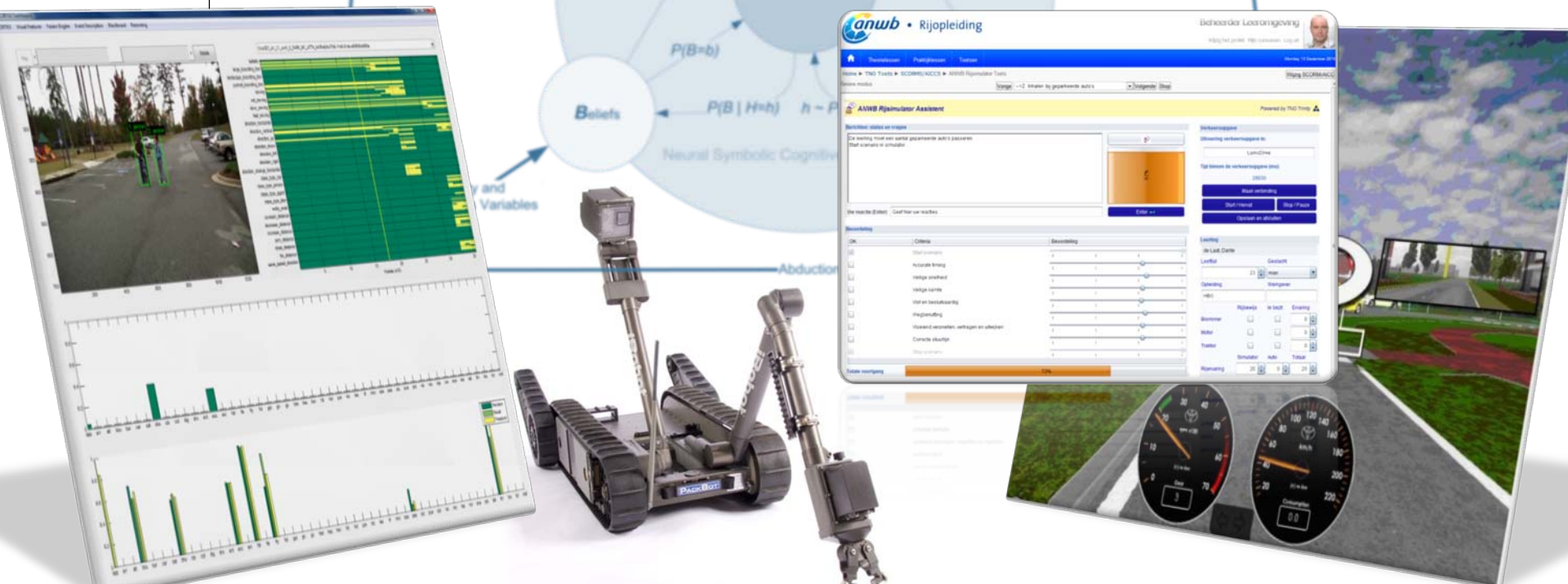
Neural-Symbolic Cognitive Agents

Architecture and Theory

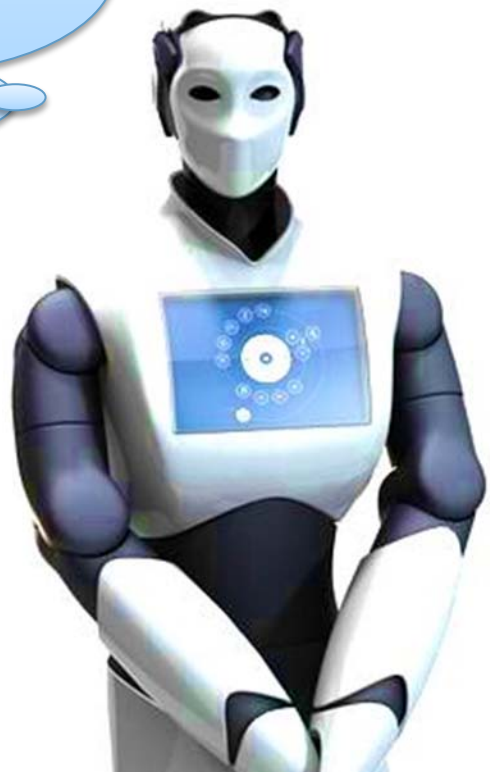


Leo de Penning
Artur d'Avila Garcez
Luis Lamb
John-Jules Meyer


Knowledge
1.00: R48 ↔ fast_moving ∧ direction_vertical ∧ close_distance ∧ arrive ∧ bounce ∧ chase ∧ ●R1 ∧ ●R3 ∧ ●R4 ∧ ●R8 ∧ ●R9 ∧ ●R10 ∧ ●R11 ∧ ●R12
Symbolic Rules (Temporal Logic)
0.78: R13 ↔ mycar_BrakeDepression <= 49.2 ∧ mycar_EmergencyLight = false ∧ mycar_Gear >= 1 ∧ mycar_SteeringAngleVelocity >= -57.5 ∧ objectives_flow_score <= 49 ∧ objectives_safe_score <= 49 ∧ ●R1 ∧ ●R4 ∧ ●R6 ∧ ●R7 ∧ ●R8 ∧ ●R10 ∧ ●R28
Induction
Deduction
Rules
P(B ∧ Ht-1, Ht) ∀r ∈ R
P(B | Ht) ∀r ∈ R
P(Ht-1 | Ht) ∀r ∈ R
RTRBM
P(B=b)
P(H | B=b, Ht-1)
P(B | H=h)
h ~ P(H | B=b, Ht-1)
Beliefs
Hypotheses
Neural Symbolic Cognitive Agent (NSCA)
ApproachingIntersection ∧ (DistanceIntersection = 0) ∧ (ApproachingTraffic = right) ∧ (Speed = 0) → (Evaluation = good)
Binary and Continuous Variables
Beliefs on Hypotheses
Observations
Abduction
Mind


Knowledge
Symbolic Rules
(Temporal Logic)
Rules
RTRBM
Beliefs
Abduction
VISUAL
INTELLIGENCE
AUTOMATED
ASSESSMENT
anwb • Rijopleiding

INTERESTED IN THE FUTURE?
CHECK OUT MY BRAIN!



This is a talk about

Agents

... and prototypical languages, reactive objects, object capabilities, and more!

Come see it! It's gonna be **fun**!

MASSPA-Modeller: A Spatial Stochastic Process Algebra modelling tool

ICCSW 2011

Marcel C. Guenther, Jeremy T. Bradley

Department of Computing, Imperial College London

September 26, 2011

Introduction

Spatial population modelling:

- Systems Biology, Ecology, Performance Analysis, ...

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Problem:

- CTMCs with enormous state spaces

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Solution:

- High-level modelling languages: process algebras, stochastic Petri nets, ...

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Spatial population modelling:

- Systems Biology, Ecology, Performance Analysis, ...

Problem:

- CTMCs with enormous state spaces

Solution:

- High-level modelling languages: process algebras, stochastic Petri nets, ...
- Moments approximating ODEs: $\mathbb{E}[Prey]$, $Var[Predator]$ [1, 2]

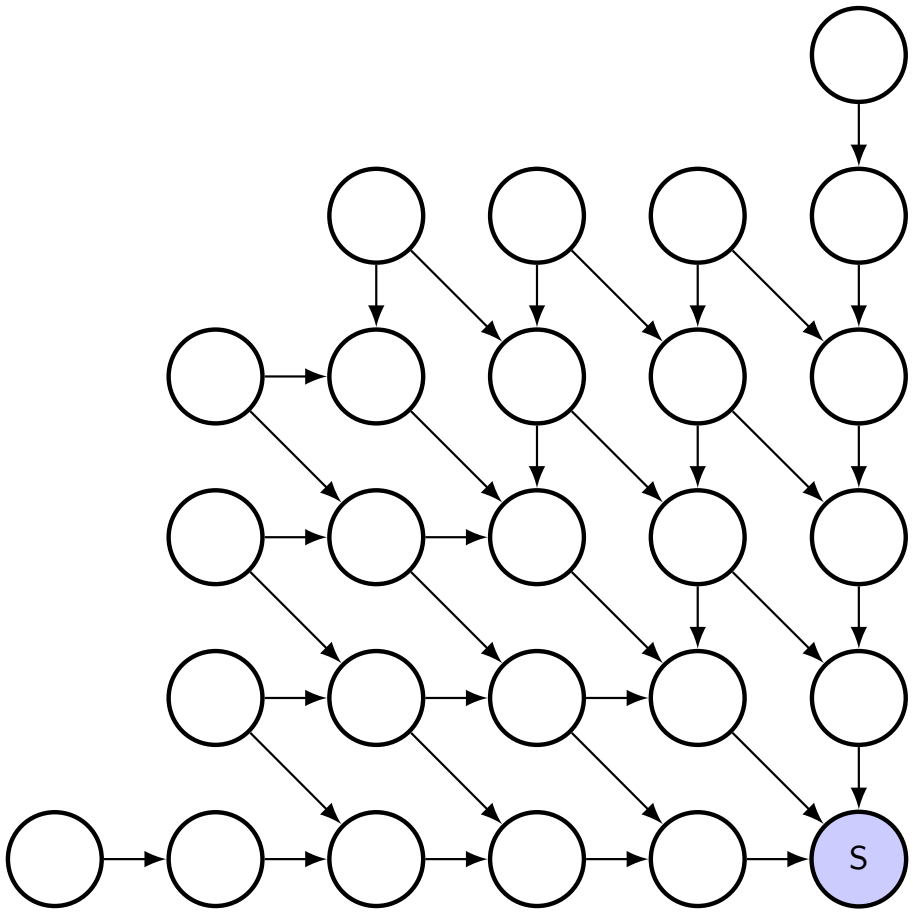
Introduction

- What if high-level descriptions become tedious?

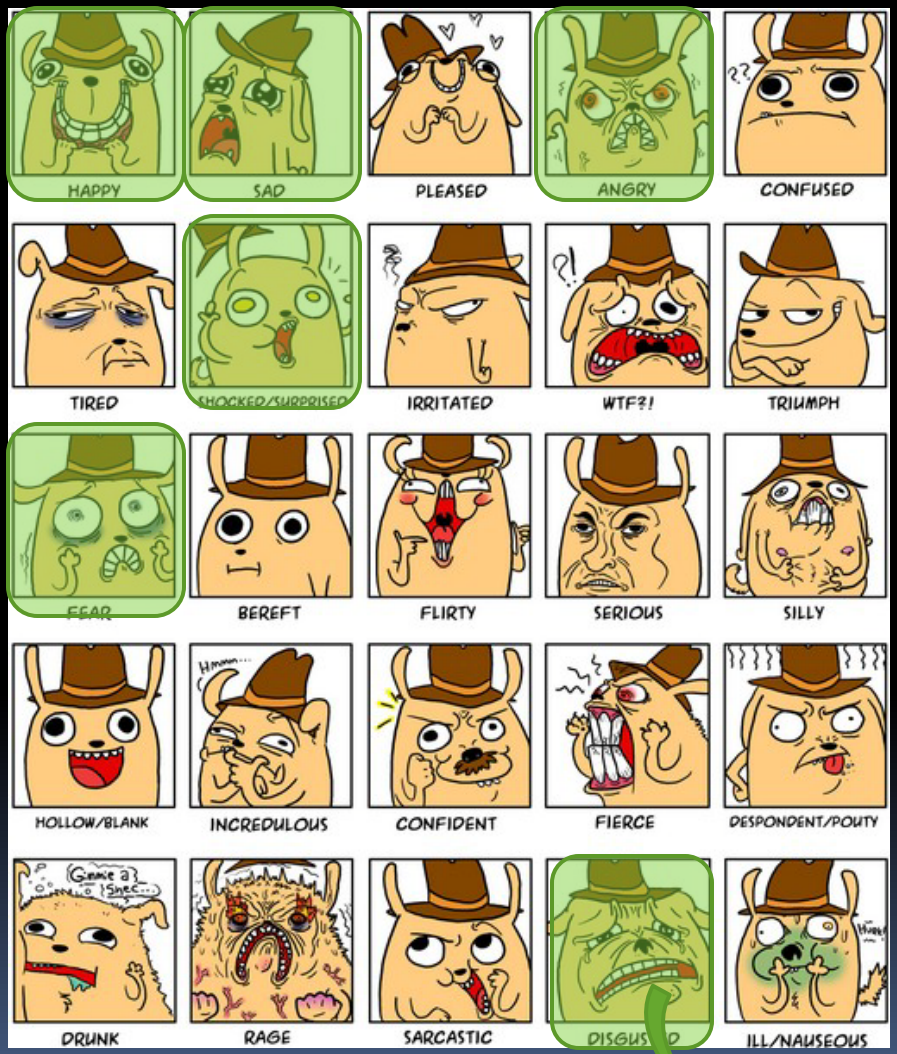
```
Agent OnOff {
  On  = !(1.0,M,1.0).Off;
  Off = ?(M,1.0).On;
};

Locations = {A,B,C,D,E,F,...};

On@A  = 450; Off@B = 450;
Off@C = 300; Off@D = 300;
...

Channel(On@A,Off@B,M) = 1/450;
Channel(On@B,Off@C,M) = 1/300;
...
```

Introduction

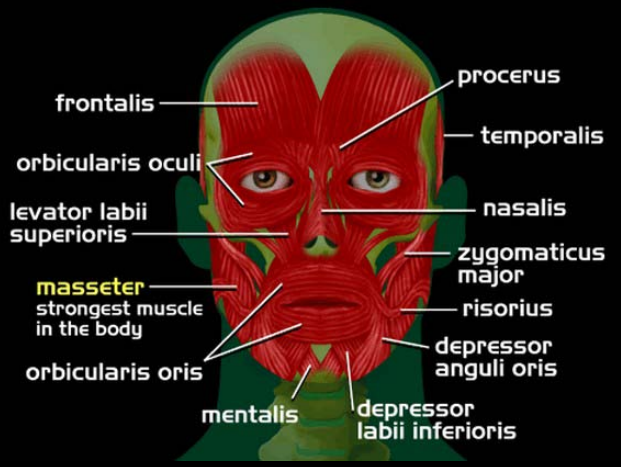
Visual modelling:



Facial Expressions

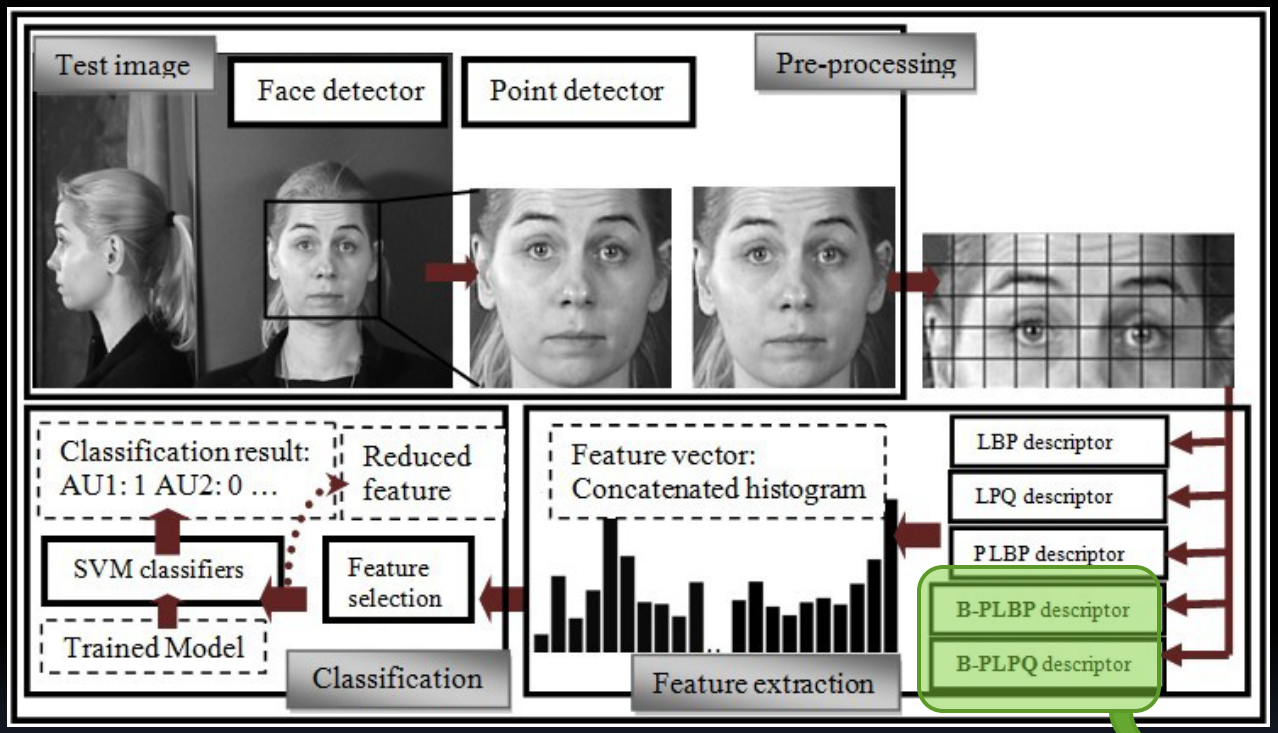


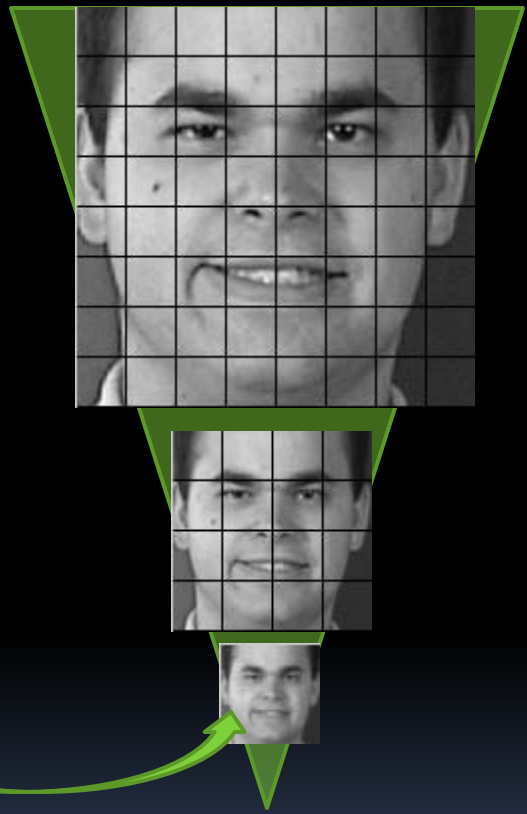
Facial Action Coding System (FACS)



e.g. AU9 + AU10 + AU16 + AU17 + AU25 + AU26

Facial Action Recognition using sparse appearance descriptors and their pyramid representation





Bihan Jiang, Michel Valstar, Maja Pantic

Session 3: Thursday 29 September, *15:50 - 16:50*

Reduction of Variability in Split–Merge Systems

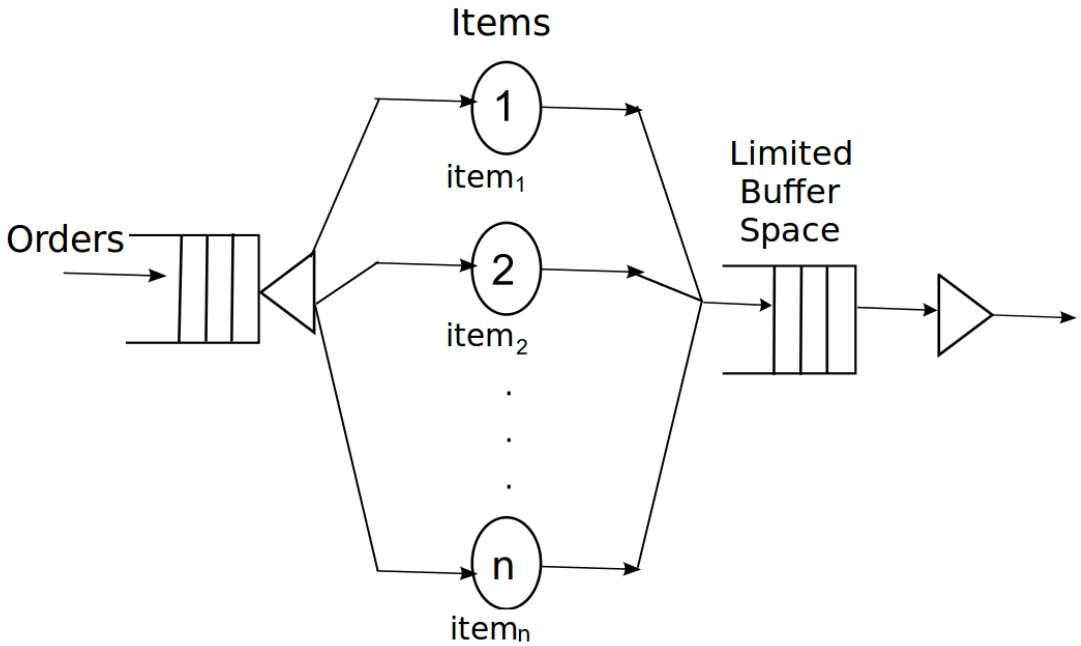
Iryna Tsimashenka, William Knottenbelt

Imperial College London

September 29, 2011

Context

- Example scenario: Automated warehouses.



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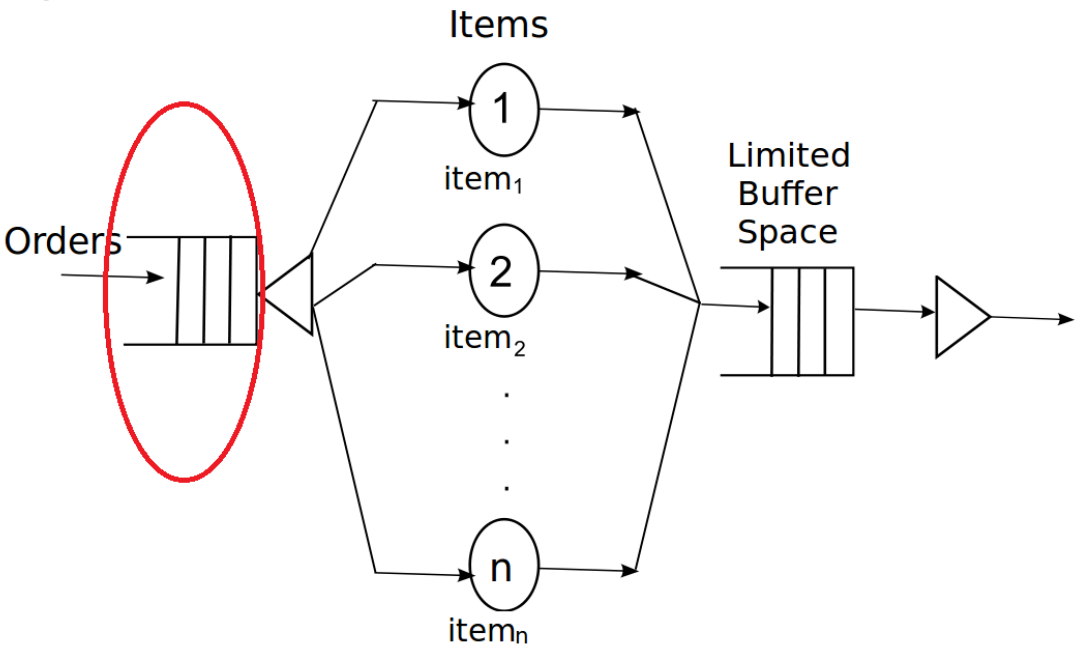

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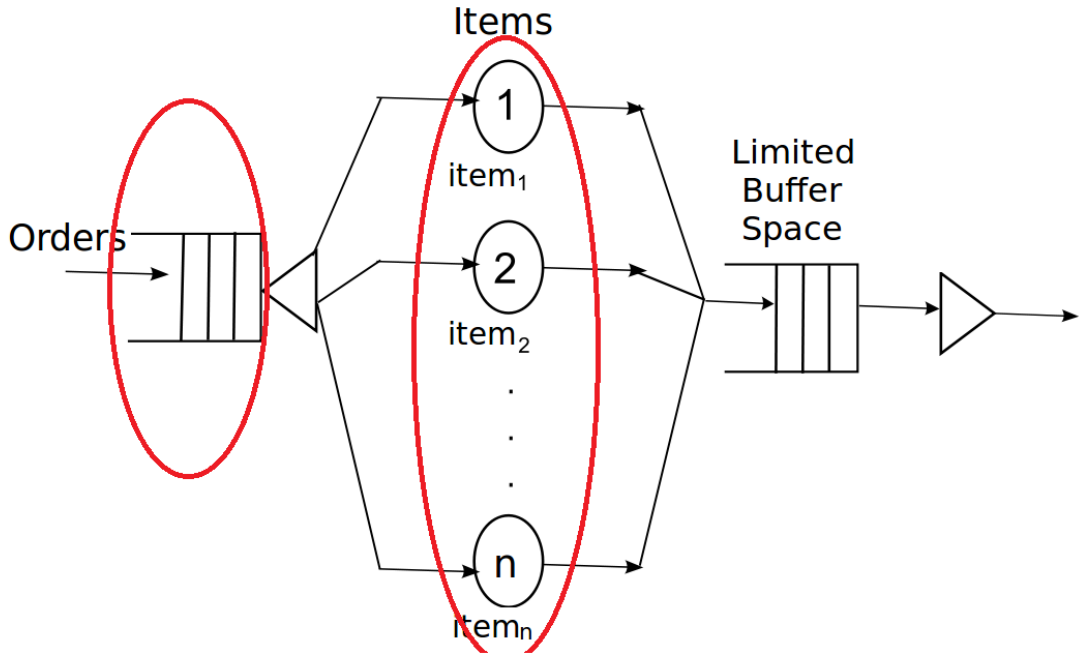

Context

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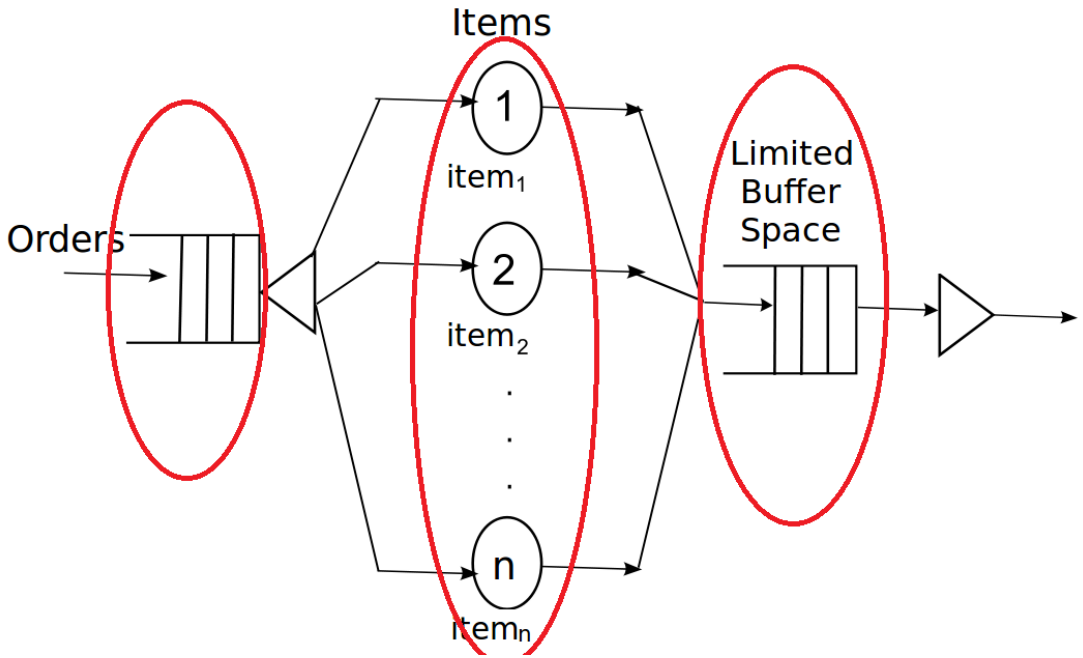

Context

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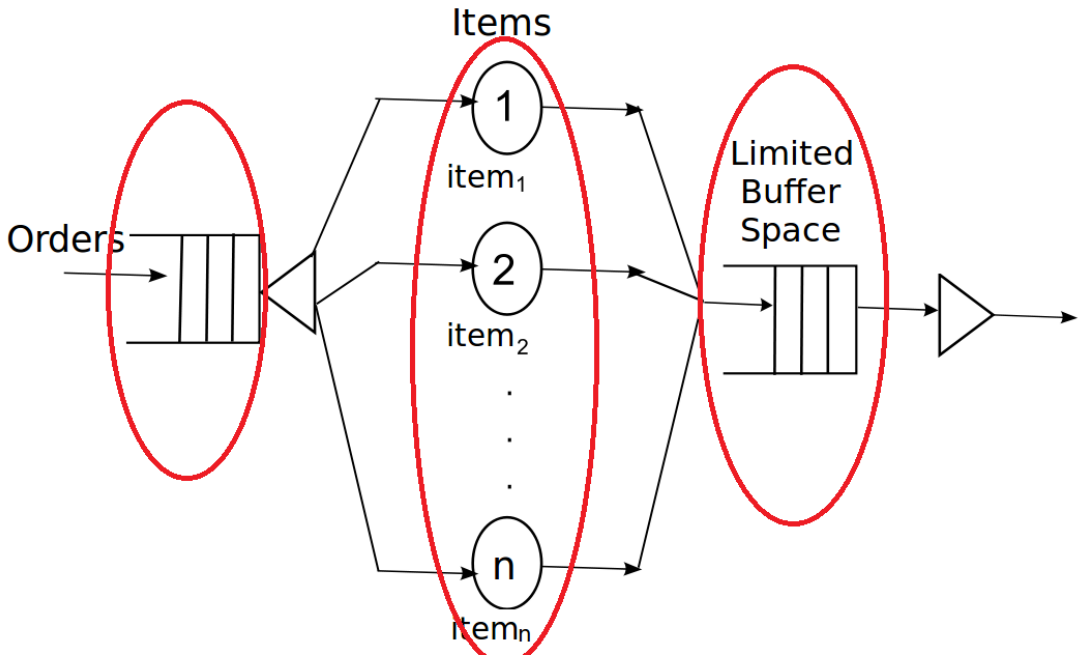
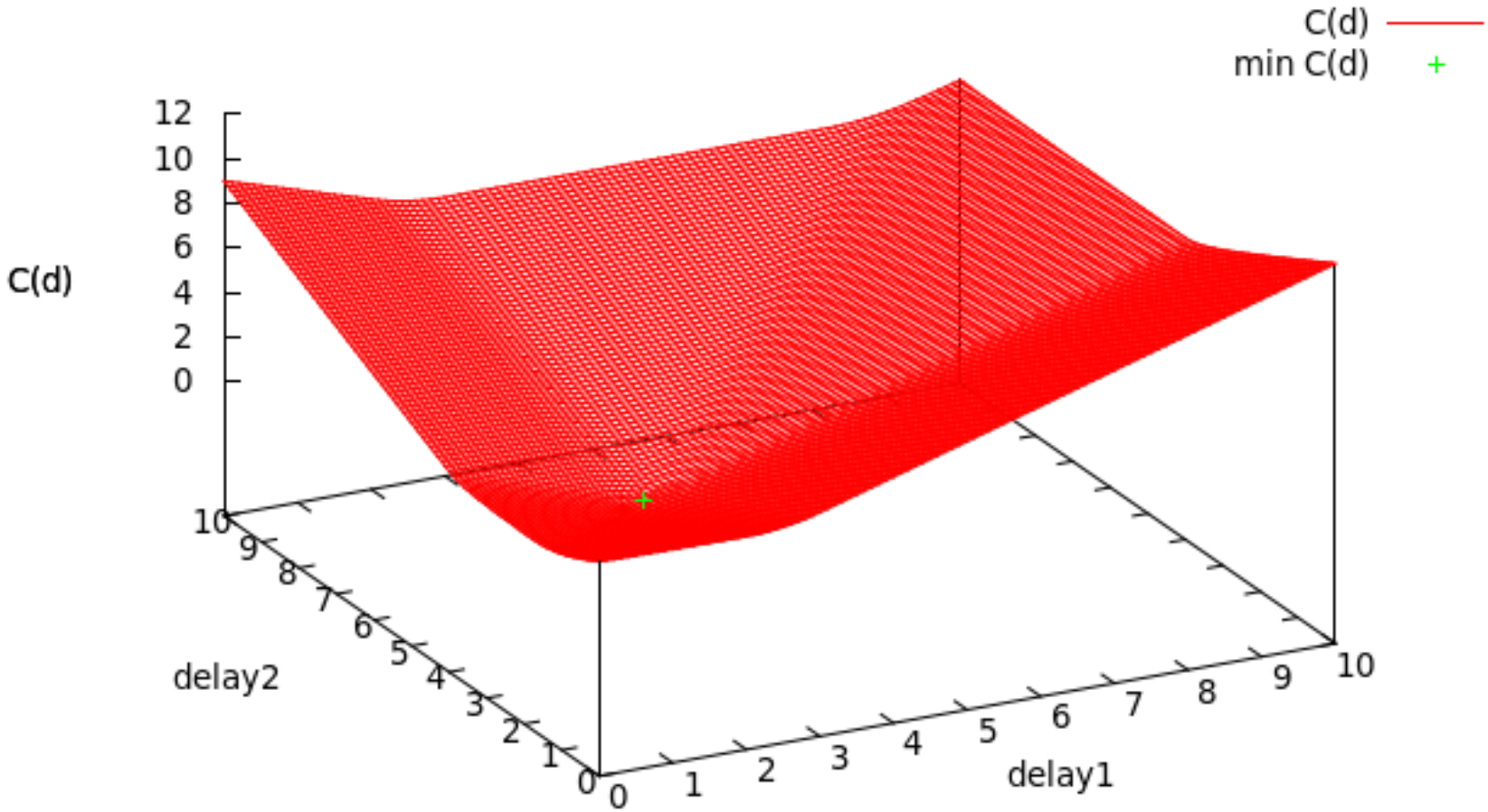


- Challenge: Determine optimal delay for each item in order so that item for the same order arrive in output buffer at approximately the same time.

Special Point of Interest

Adding delays into a system can improve aspects of system performance

Taste Of Results



Björn Lellmann

- Working towards a PhD at Imperial College with Dirk Pattinson
- Studied in Freiburg, Germany
  Dissertation on complexity theory over arbitrary structures

Björn Lellmann: Works

Non-iterated Modal Logics

Axioms without nested modalities
E.g. $\Box\top$, $\Box A \to A$, $(A \to B) \to (A > B)$, but not $A \to \Box\Diamond A$

- How to turn sets of axioms into nice proof systems?
  (i.e. cut-free sequent systems)
- Can we get generic decision procedures of good complexity?
  ("plug in your axioms")

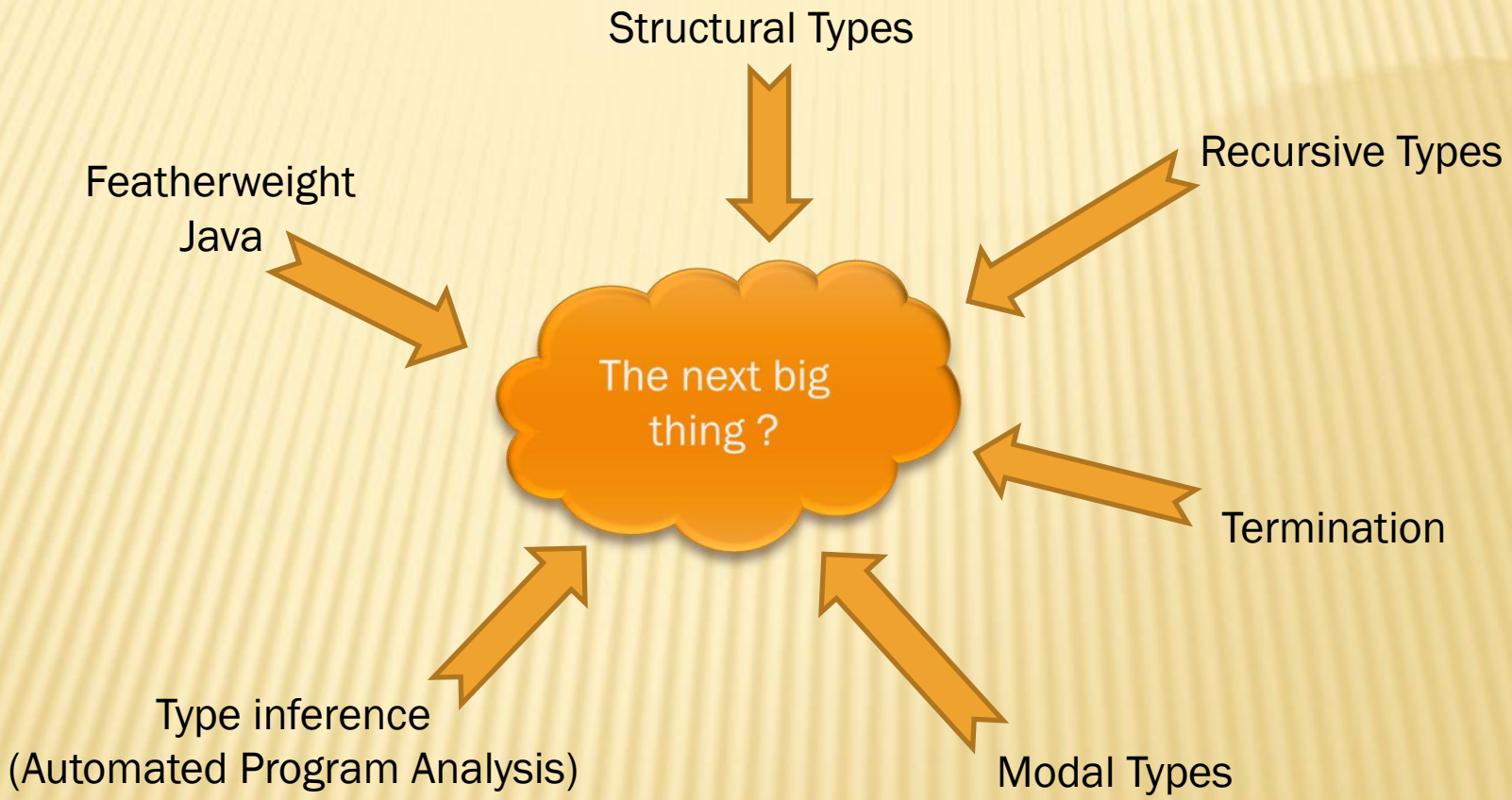
Parameterised Complexity Theory

Idea: isolate a parameter which makes a problem intractable

SAFE, FLEXIBLE RECURSIVE TYPES FOR FEATHERWEIGHT JAVA

- Reuben Rowe
  - Imperial College London
- 4th Year PhD Student
- Researching:
  - Object-Orientation
  - Type Systems
  - Denotational Semantics
  - Intersection Types

SAFE, FLEXIBLE RECURSIVE TYPES FOR FEATHERWEIGHT JAVA



Department of Computer Science
University of Oxford

Time-Bounded Verification of CTMCs Against Metric Temporal Logic

Marco Diciolla

ICCSW 2011
Computing Student Workshop
29/09/2011
Imperial College

Joint work with : Taolue Chen, Marta Kwiatkowska and Alexandru Mereacre

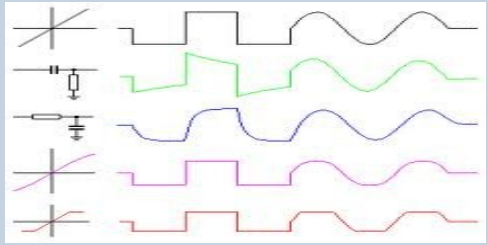
Time-Bounded Verification of CTMCs Against Metric Temporal Logic

Can I check that my airbag will deploy on time?

Complex system ...

Stochasticity ...

Interaction



Time constraints ...

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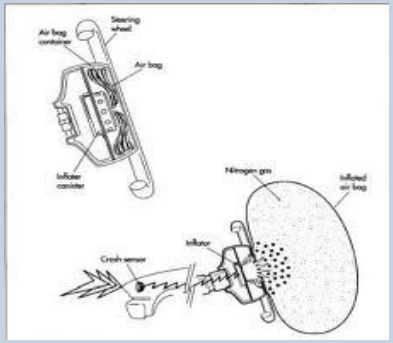
Marco Diciolla

Time-Bounded Verification of CTMCs Against Metric Temporal Logic

What can we do?

Model of the System :
Airbag

Property :
Airbag will always deploy on time



Model Checker

YES,NO

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Marco Diciolla

Applying Algebraic Specifications on Digital Right Management Systems

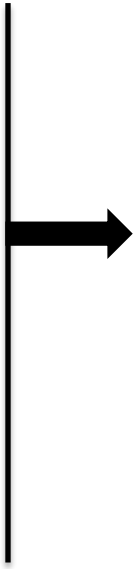
Nikolaos Triantafyllou, Katerina Ksystra, Petros Stefaneas and Panayiotis Frangos

National Technical University of Athens

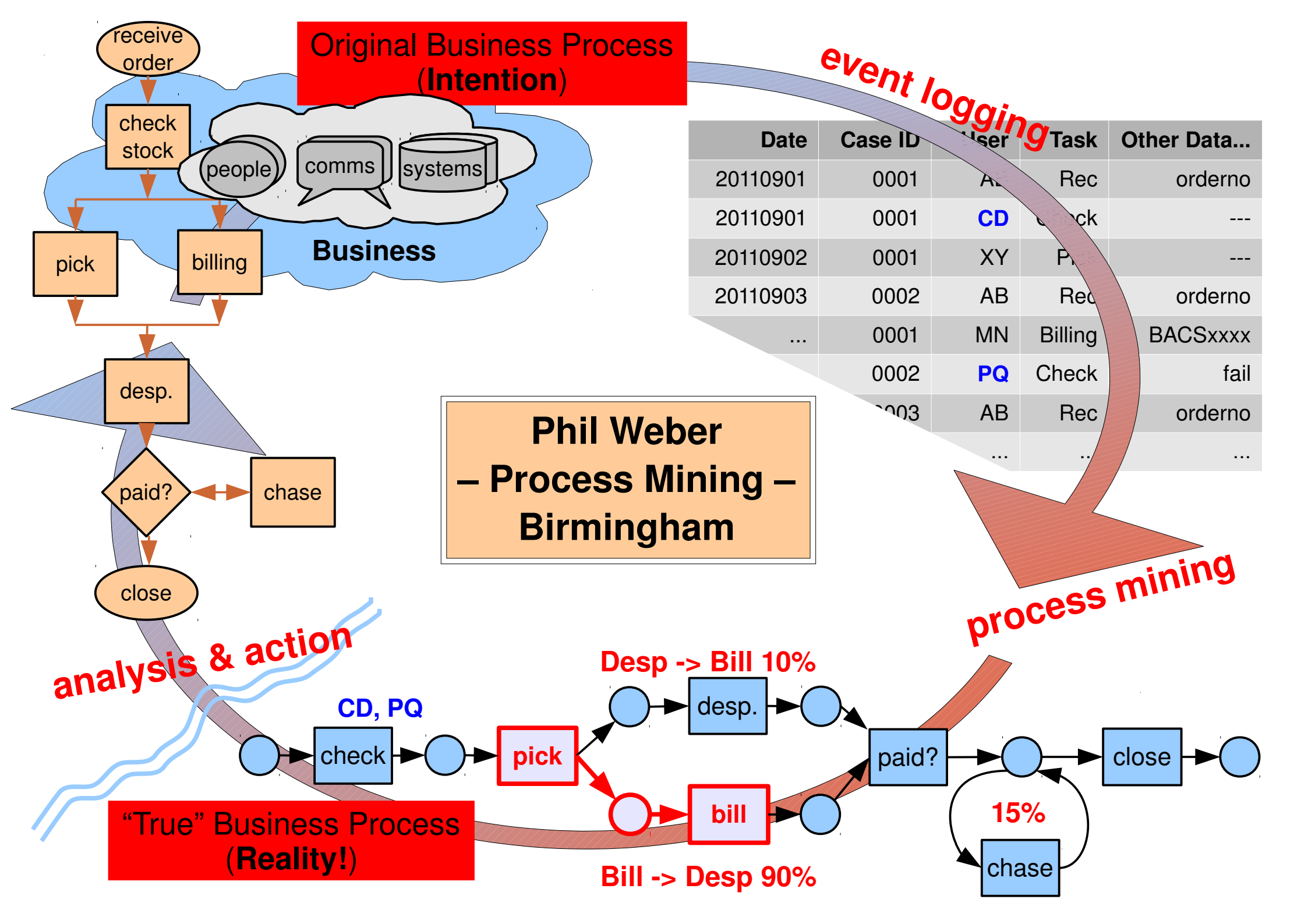
29-30th September 2011

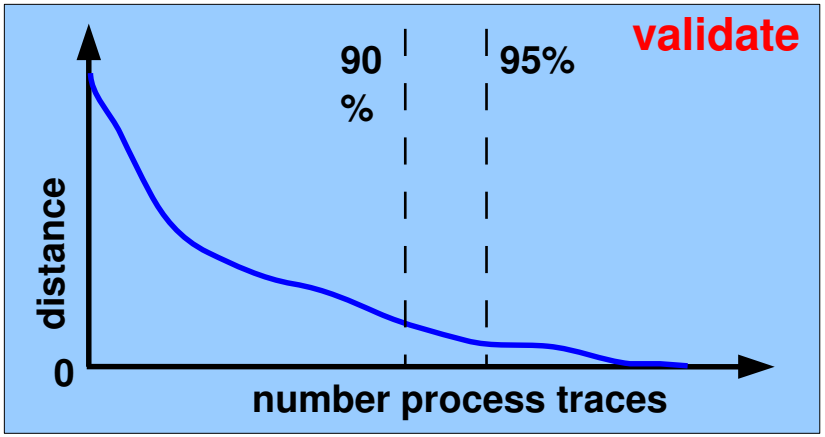
Problems on mobile DRM systems and way to address them using Algebraic Specifications

- Ambiguity of languages used
- Unverified Algorithms
- Bugs on Algorithms
- Lack of Interoperability



- Abstract Syntax and automated tools
- Formal Specification and verification
- New approach using ideas from algebra and formal verification of desired properties
- Institutions??


receive order
check stock
people
comms
systems
Business
pick
billing
desp.
paid?
chase
close
Original Business Process (Intention)
event logging
Date
Case ID
User
Task
Other Data...
20110901 0001 Rec orderno
20110901 0001 CD ck ---
20110902 0001 XY P ---
20110903 0002 AB Rec orderno
... 0001 MN Billing BACSxxxx
0002 PQ Check fail
003 AB Rec orderno
... .
Phil Weber
– Process Mining –
Birmingham
process mining
analysis & action
CD, PQ
check
pick
Desp -> Bill 10%
desp.
bill
Bill -> Desp 90%
paid?
15%
chase
close
"True" Business Process (Reality!)



core – – ICCSW

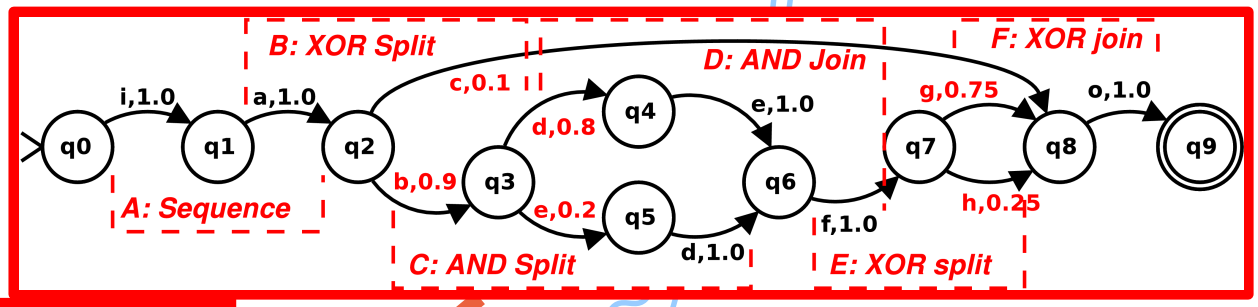
predict window

1. 20100901, 01, AB, Recv,
2. 20100901, 01, CD, Chk,
3. 20100901, 01, XY, Pick, fail

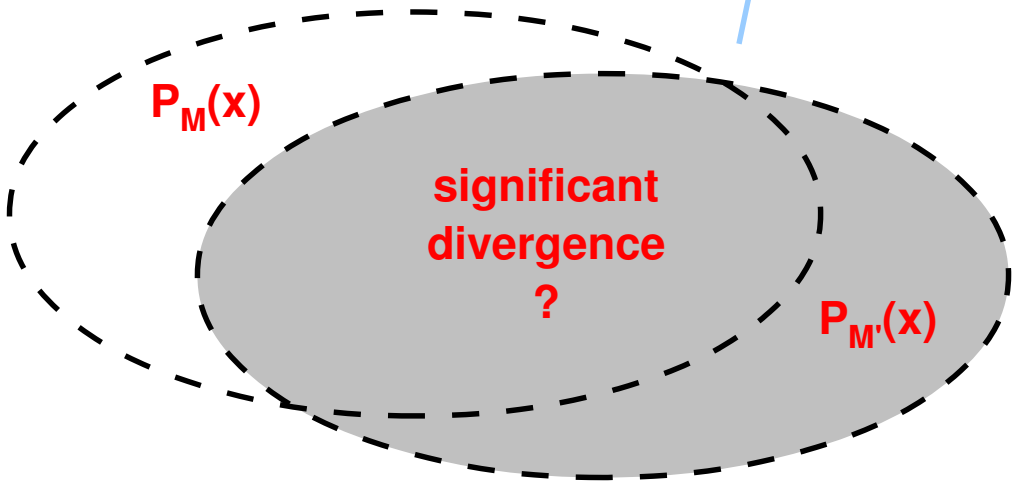
n.

sliding window

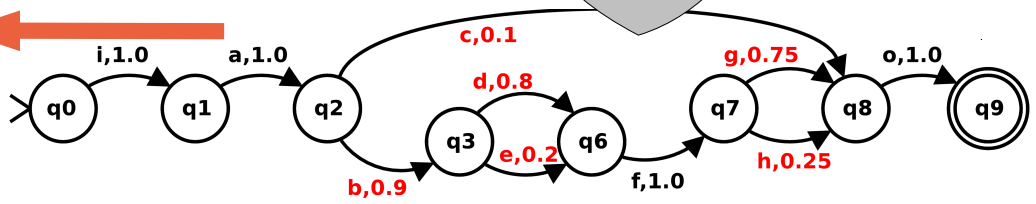
process mining



Ground Truth (distribution)



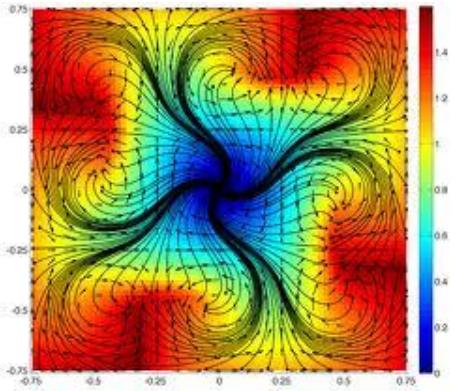
Mined distribution



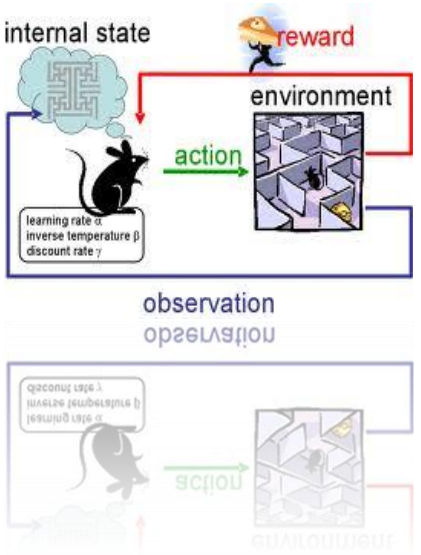
Imperial College London

Ekaterina Abramova, Daniel Kuhn, Aldo Faisal

Combining Markov Decision Processes with Linear Optimal Controllers



- Optimal Control (OC)
- Linear OC $\mathbf{x}_{k+1} = \mathbf{A}\mathbf{x}_k + \mathbf{B}\mathbf{u}_k$
- Non-Linear OC $\mathbf{x}_{k+1} = \mathbf{A}(\mathbf{x}_k)\mathbf{x}_k + \mathbf{B}(\mathbf{x}_k)\mathbf{u}_k$



- Reinforcement Learning (RL): Markov Decision Processes (MDPs)
- Both have advantages and disadvantages

Imperial College London

Ekaterina Abramova, Daniel Kuhn, Aldo Faisal

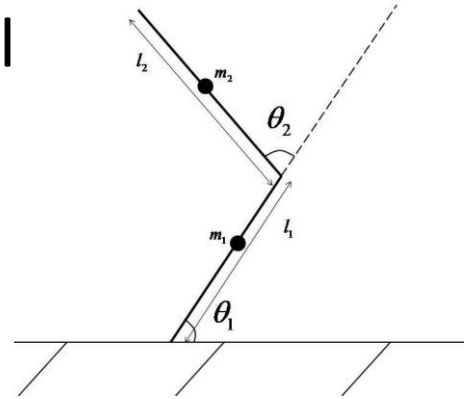
Combining Markov Decision Processes with Linear Optimal Controllers

- Combining RL with OC to produce RLOC

  Motivation: evidence of OC used by the brain for motor tasks and of RL used by the brain for learning

- Application: Robotic Control and Neuroprosthetic Arm

$$\mathbf{x} = (\theta_1, \theta_2, \dot{\theta}_1, \dot{\theta}_2)^{\mathbf{T}}$$



Model-based Self-Adaptive Components: A Preliminary Approach

Pedro Rodrigues, Emil Lupu

Department of Computing
Imperial College London

Imperial College
London

Motivation

- Modern software systems are growing in terms of:
  - » scale
  - » complexity
  - » dynamicity
  - » heterogeneity
- Only Human management
  - » deficient dependability level

- Self-managing systems
  - » effective approach

- Model-based adaptation
  - » improves reliability
  - » enhances trust

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Problems facing current approaches

- Structural adaptation
- Centralised model
- Centralised decision-making
- Adaptation costs
- Behavioural evolution

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Proposed approach

See the presentation later on

Thank you